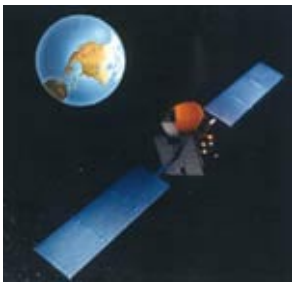
The Rapporteur

July 2002 Issue 2 Consultative Committee for Space Data Systems



The Rapporteur is a newsletter, published by the CCSDS Secretariat for members and associates, which provides a summary of current activities and accomplishments of CCSDS.

From the Secretariat

All CCSDS Members, Observers, Liaisons, and Associates are invited to attend the CCSDS Space Ops Plenary meeting scheduled to coincide with the opening of the 2002 Space Ops in Houston, Texas, U.S. on 9 October 2002. More details on this event will be provided to CCSDS participants next month.

We would also like to welcome the Pakistan Space & Upper Atmosphere Research Commission as an Observer agency to CCSDS.

TCP Tranquility

The Space Communications Protocol Specification (SCPS) development team notes that there has recently been a large number of commercial product developments that use TCP Tranquility (SCPS-TP) for Internet-over-satellite applications.

TCP Tranquility is optimized to provide reliable end-to-end delivery of spacecraft command and telemetry messages between computers that are communicating over a network containing one or more potentially unreliable space data transmission paths. TCP Tranquility extends the terrestrial Internet's Transmission Control Protocol (TCP) for optimized use over the space link.

Since TCP Tranquility is open source, it is free for use and evaluation via a reference implementation (www.scps.org). Over 100 copies of the TCP Tranquility Reference Implementation have been distributed to government, industry, and academia.

The SCPS protocol suite, made up of Network, Security, Transport, and File Transfer protocols, enables seamless extension of the terrestrial Internet into the resource-constrained environment of space. The protocol specifications are published as both CCSDS Recommendations and ISO standards.

CCSDS File Delivery Protocol

The CCSDS File Delivery Protocol (CFDP) is being revised to include multi-hop transfers. The current CCSDS Recommendation, which recently completed ISO Draft International Standard (DIS) review, covers reliable delivery between a spacecraft in low earth orbit or deep space and a ground station (in both directions). An example of a multi-hop scenario would involve a Mars rover that transfers a file to a science workstation on earth via a lander, orbiter and ground station. The extended functionality will be accomplished by using either "Extended Procedures" or a "Store and Forward Overlay". The Extended Procedures are already supported in the European Space Agency (ESA) CFDP implementation that enables incremental, immediate forwarding of Protocol Data Units (PDUs) at waypoints without requiring retention of complete files. The Store and Forward Overlay system provides route tracing and diagnostic facilities, enables continuation from a known failure point, and does not entail modification of the implementation of CFDP itself.

Open Archival Information System

CCSDS Panel 2 has completed the development of its Recommendation for the Open Archival Information System (OAIS). This document is a technical recommendation for use in developing a consensus on what is required for an archive to provide permanent, or indefinite long-term, preservation of digital information. The Recommendation was originally intended for space data, but now includes traditional archives as well.

The document presents an OAIS reference model that addresses a full range of archival information preservation functions including ingest archival storage, data management, access, and dissemination. It provides illustrative examples and some best practice recommendations.

The OAIS reference model is applicable to organizations that create or process information that may need long-term preservation. Likewise, it is also applicable to organizations that may need to acquire this information from archives. Long-term is defined as long enough to be concerned with the impacts of changing technologies, including support for new media and data formats or with a changing user community.

It is expected that this reference model, by establishing minimum requirements for an OAIS archive along with a set of archival concepts, will provide a common framework from which to view archival challenges, particularly as they relate to digital information. This should enable more organizations to understand the issues and take proper steps to ensure long-term information preservation.

The reference model has been well received by a diverse community of institutions interested in the long-term preservation of digital information. A number of digital initiatives in the library community, such as the CURL Exemplars in Digital Archives (CEDARS), Preserving and Accessing Networked Documentary Resources of Australia (PANDORA) and Networked European Deposit Library (NEDLIB) projects, have either adopted the OAIS model as the conceptual framework behind their digital preservation efforts, or have been informed by its conclusions.

The development of standards in support of the OAIS reference model may serve to promote interoperability among digital libraries, archives and other institutions maintaining digital information over the long term.

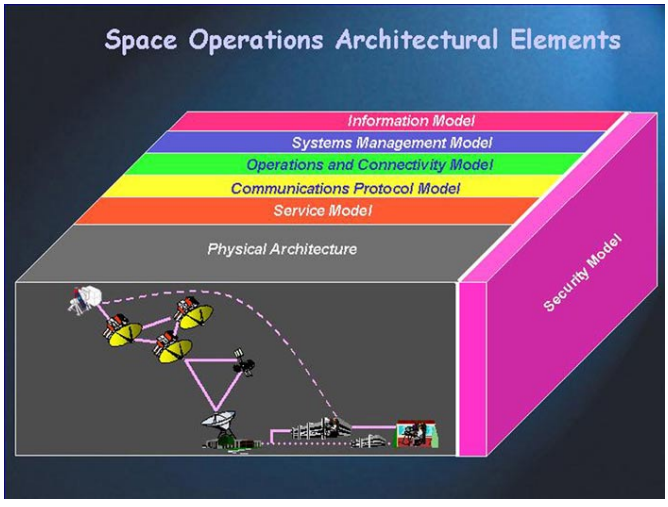
CCSDS Architecture

CCSDS has appointed an ad hoc working group to define a unified CCSDS architecture. The working group is tasked to develop an architecture model that defines the structure of components, their relationships, and the principles and guidelines governing their design and evolution.

A general CCSDS architecture can be used as the foundation for:

- ensuring the consistency of CCSDS Recommendations;
- identifying problems associated with interoperability;
- identifying missing standards;
- establishing definitions; and
- explaining CCSDS standards to users.

The model proposed at the Spring 2002 TSG meeting (below) will be the basis for the architecture to be developed.



CCSDS Architecture Model